

GLOBAL SKILLS REPORT

2005

Globalization is here to stay.

So where are the skilled employees?



In conjunction with:

Charles A. Handler, Ph.D.
Rocket-Hire

Mark C. Healy, M.A.
De Anza College

Global Skills in the 21st Century

Brainbench's 2005 Global Skills Report provides a snapshot of the most popular skills in the United States and around the globe. Drawing on the employment skills certifications of over 300,000 people from 179 countries, we reveal the location of concentrations of skilled workers throughout the world.

This Brainbench Global Skills Report 2005 is the third and most comprehensive report since the first version was released in 2001. As the geographical location of certification respondents continued to increase and, at times, surprise us, the scope of the assessment library expanded beyond the initial IT focus to encompass today's areas of need: call center service expertise, health care, business management and general communication.

With a number of surprising findings, this report doesn't just rank skills. From India to Indiana, New Delhi to New Mexico, we uncover trends and peer into the future of the global skills marketplace.

What's Inside?

Brainbench ranks common information technology and business skills by country as well as by U.S. state. In addition, we reveal the most commonly certified skills, trends and changes from our 2003 study, and insights into these results.

Who is Brainbench?

With more than 5.5 million registered users and more than 600 different assessments, Brainbench is the global leader in measuring the individual skills, abilities and personality traits that drive a company's bottom-line success. Brainbench helps clients test, track, and improve their employees' vital job characteristics, using the industry's largest ISO 9001:2000 library of tests. Their online assessment solutions improve hiring, retention, training success, customer satisfaction, and profitability for organizations such as Advance Auto Parts, Department of Homeland Security, H&R Block, IBM, Manpower, NASA, TAC Worldwide, TEKsystems, Wells Fargo and over 4000 other organizations. Strategic Investors include Manpower and Thomson Corporation.

For more information visit www.brainbench.com.

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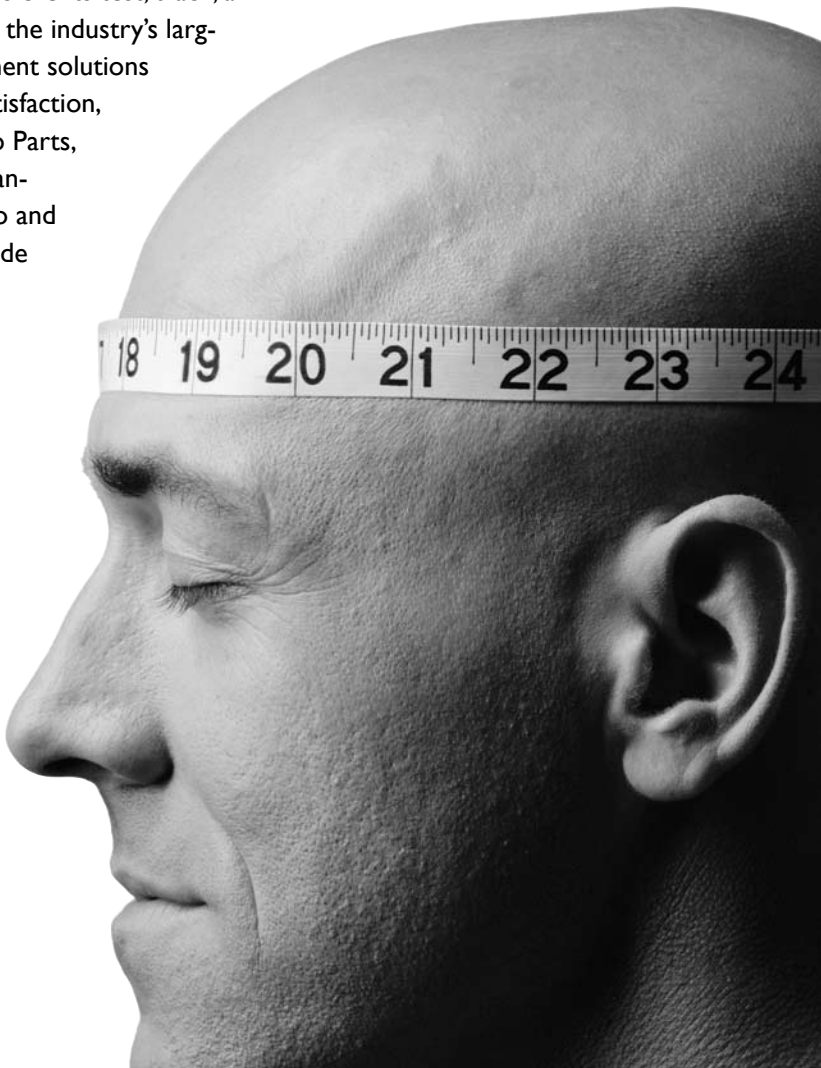
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ABOUT THIS REPORT

A Note about our Methodology

The individuals comprising this report attempted certification in one or more skills via Brainbench's online skills certification site. Certifications completed from May 1, 2004 to April 30, 2005 are included in the study. Failures to reach certification were not included in this report. Specifically, an individual must have achieved a score high enough to be dubbed "certified" for the given skill level (a score of ≥ 2.75 out of a possible score of 5.0). Poor test results only indicated an interest in a given subject area, as opposed to competence in a given subject area. Therefore, this report focuses on regional competence – as opposed to interest – across skill areas.

In addition to completing their certification, individuals must have chosen a valid country or state as part of their registration with Brainbench. In the case of multiple certifications, a test for a given subject area can only be counted once for a given individual. Moreover, an individual can have multiple certifications across different subject areas, and each of those certifications can count towards relevant state and country totals.

The Tests and the People

This unprecedented assessment of global skills started with 918,933 tests completed between May 1, 2004 and April 30, 2005. Of those administrations, 542,170 achieved passing scores. And of those, 303,651 were for unique tests by a given individual who provided a valid state and country value (that is, we removed multiple instances of test results for a given test taken by a given individual.) Thus, this report represents 303,651 validated test results.

Where in the World?

The 303,651 certified individuals represent 179 countries. Nations that use English as a primary or even secondary language have a decided advantage

over non-native English speaking countries, as all Brainbench skills tests are targeted towards English-speaking test takers.

Data and Trends

This report contains data and trends for six skill categories:

- Information Technology
- Finance
- Customer Support
- Sales & Marketing
- Management
- Health Care

Although certifications are offered in hundreds of skill areas, Brainbench is best known for its information technology assessments amongst employers using Brainbench for pre-employment testing purposes; therefore, the IT rankings include 6 subsections:

- Database Development and Administration
- Programming and Development
- Systems and Network Administration
- Technical Support
- Telecommunications
- Web Development and Administration

Terminology

- **Certification** – passing score of ≥ 2.75 out of 5 on a Brainbench Assessment
- **Category** – a grouping of subject areas (Health Care, IT, Finance)
- **Subcategory** – only applies to IT – Within IT, a subcategory would be Programming and Development, for which a subject area would be C++
- **Subject area** – example, C++ or Nursing Assistance – also referred to as skill area

EXECUTIVE SUMMARY

(The executive summary was completed by Dr. Charles Handler, an internationally known thought leader in the development of online screening and assessment technology. His opinions and findings are based on the information presented in this report.)

Introduction

This report combines data collected by Brainbench with extensive research into secondary data regarding major trends in the role which skills play in the development of our global economy. The primary source of the data collected involves the aggregated results of completed Brainbench assessments from May 2004 through April 2005. The data is related to certifications in 6 major skill areas with Information Technology and its 6 subsections being the major area of focus. The goal of this research is to provide both an overall understanding of the role that skills play in the current global economy, as well as in shaping the future. Meeting this goal requires the presentation of both granular data, which provides a very focused insight into specific trends (i.e., IT skill levels across different nations), as well as broader insight into the collective meaning of these more focused results (i.e., Overall trends in outsourcing).

This report is unique in that the information leverages actual data regarding worldwide usage of skills certification testing to address subjects that have been receiving a high level of visibility in our current culture.

Summary of this Report and its Specific Findings

There is quite a bit of depth to the results summarized in this document. The major findings cut across several key areas. Presented below is a very high level look at findings sans any interpretation, as the body of the report provides insight into the context and meaning of each of the findings listed below. Major findings include:

- Slightly more than ½ of individuals passed Brainbench certification assessments, suggesting

that these assessments do provide a significant way to identify individuals with competency in specific areas of knowledge.

- The U.S., India, and Russian Federation have consistently been the countries with the most Brainbench certifications, indicating that they may represent the largest pockets of competent and available IT resources.
- The U.S. accounted for the largest number of skill certifications. However, certifications in India increased over 300% in the past two years and India led the U.S. in 6 skill areas, including all three Java programming competencies.
- Eastern Europe, specifically the Russian Federation, has a significant and growing body of competent IT talent.
- Canada has a large body of competent IT talent and is a leader in Customer Support competence.
- IT competence in Western Europe and Southeast Asia are also on the rise.
- Certifications in the U.S. are in decline while those in many other countries appear to be on the rise.
- Within the U.S. there is no one state that accounts for the majority of certifications; however, as a region the South has seen more certifications than any other region.
- The U.S. is a leader in security-based certifications.
- Certifications for Microsoft software represent a majority of all certifications awarded; however, certifications for open source operating systems (i.e., Linux and UNIX) have begun to overtake those for Windows.
- The U.S. is leading the push for the assessment of soft skills, although this area is still not as common as hard skills testing.
- Functions besides IT (i.e., Health Care) are being outsourced.

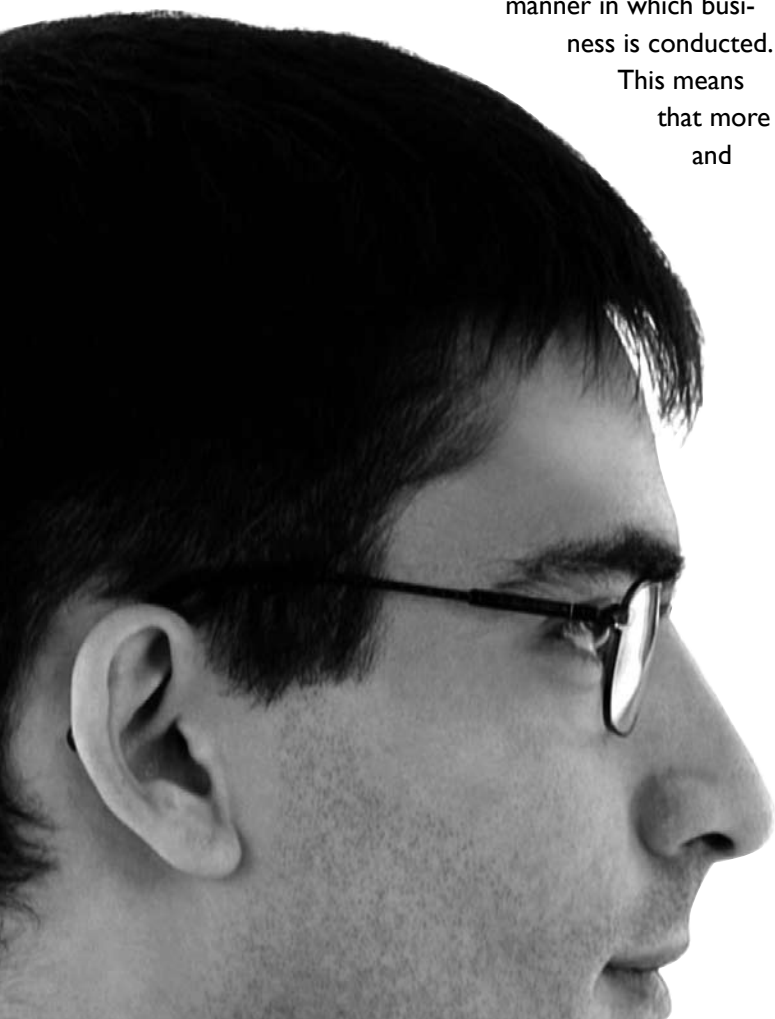
High Level Interpretation of Findings

Taken as a whole, the findings outlined in this report suggest some interesting trends. While the specifics of these trends are discussed in more detail in the body of the report, this section leverages this information to provide the following insights:

- IT competence is on the rise worldwide and represents a significant economic factor for countries of all sizes. While the ability to create a knowledge-based economy is an engine for economic development in emerging nations, it is also a significant growth factor in the economy in more established nations. No matter the location, high levels of competence are a significant factor in the ability to realize increased profits and economic prosperity.
- The same basic knowledge, skills, and competencies underlie jobs across the globe - meaning that work is starting to take on a common language. This will greatly facilitate the development of a more global economy in which geographic boundaries are not limiting the manner in which business is conducted. This means that more and

more, a competitive economic advantage requires a global mind-set and continues to justify the removal of geographic barriers to conducting business.

- Effective business and economic growth requires organizations to make strategic choices regarding the geographic location of critical business components (i.e., programming, customer service). These choices are based on a combination of trade-offs, most prominent of which are the evaluation of available skill and knowledge levels in a geographic area vs. the cost of obtaining access to those skills. Areas offering a combination of high skill levels with low costs for access to those skills will be more likely to lead to the outsourcing of business functions to these areas.
- Education is becoming increasingly important especially for emerging nations that are working to develop new knowledge and skills-based economies. In turn, a critical factor in stimulating economic growth will be the development of a skilled and competitive labor force.
- Taken together, the above conclusions place an even greater premium on selecting employees wisely. As the overall level of competence rises across the globe, the labor pool will continue to become more competitive. No matter what the situation, selecting the best most qualified individual for a specific job provides increasing levels of return on investment. This provides a strong justification for the continued growth of an assessment industry which can provide measurement of critical knowledge, skills, and abilities.



A Look at the Future

While the information presented in this report provides a valuable understanding of the current distribution and impact of global skill levels, it also provides good insight into the impact this data could have on the future of our global economy. The following points provide speculation regarding what the future may hold:

- **Assessment increases.** In order to demonstrate their competency and value, organizations will place increasing importance on the use of assessment tools. These assessments will provide verification of competency across a wide variety of knowledge and skill areas and provide increased ability to ensure the selection of qualified individuals. As more emphasis is placed on making effective selection decisions, the assessment of soft skills will continue to become more common.
- **Outsourcing second wave.** Large increases in the demand for technology skills relative to available supply and wage differentials between developed and developing nations will continue to drive outsourcing. Nations that can retain high skill levels and low wages will continue to see increased outside investment. The catch 22 is that this investment will eventually drive wages up and could stimulate a redirection of investments to areas with similar skill levels but lower wages. This may create a second wave of outsourcing which serves to stimulate growing economies in areas which are currently much less developed.

- **Skills driving local economic growth.** High skill levels within a specific nation do not necessarily exist solely to serve the U.S. Competency in a specific country or region will be increasingly significant in helping these nations develop their own businesses and an economy that will be less dependent on direct payment for outsourced IT services.
- **Niche skill development.** Options for the outsourcing of jobs will continue to grow and organizations will be increasingly able to match specific needs to areas with a high level of skill in meeting these needs. This will serve to create local niche economies which will continue to be leveraged by organizations in other geographic areas.
- **Outsourcing benefits.** While the U.S. may continue to see more technology jobs moving to other parts of the world, this may not necessarily have a detrimental impact on the U.S. economy or the number of available jobs in the U.S. Other nations will eventually outsource some jobs to the U.S. and cost savings for outsourcing jobs will allow for increased business expansion and stimulation of investment in the U.S. economy.
- **Process driven ROI.** Technology and process will be developed which will provide the ability to link skill levels directly to business results. This will provide the ability to evaluate the ROI associated with outsourcing choices related to various labor pools, allowing for justification of future investment and outsourcing decisions.



FINDINGS FROM AROUND THE GLOBE

The Top 10 Across the World

The top 10 countries, based on total skill certifications, are listed below, along with the 2003 rankings.

2003	2005
1. U.S.	1. U.S.
2. India	2. India
3. Russian Federation	3. Russian Federation
4. Canada	4. Romania
5. UK	5. Ukraine
6. Romania	6. Canada
7. Australia	7. UK
8. Ukraine	8. Bulgaria
9. Pakistan	9. Philippines
10. Bulgaria	10. Latvia

The 10 countries at the top of the heap in 2005 comprise 83% of worldwide Brainbench certifications. Australia and Pakistan slipped out of the top 10 from 2003, replaced by the Philippines and Latvia.

Although this overall ranking is informative, the bulk of this report focuses on trends not reflected above. At the end of this report, we list the top five countries for each of the most popular skill certifications; we provide similar rankings for U.S. states.

FINDING 1

The United States Led the World in Total Skill Certifications

In 2005, as in 2003, the U.S. is the clear leader in total skill certifications. It is likely that the English-speaking bias of the study and the U.S. location of Brainbench contributed to the top ranking. This occurred while certifications increased in many other parts of the world – including India's increase of nearly 300%.

Nonetheless, the United States led in 24 of the 30 IT categories, dominating others, in particular, in MS

Excel 2002, Technical Help Desk, MS Windows XP Desktop Administration, Computer Tech Support, and Web Design Concepts.

Certifications in non-IT categories were almost entirely dominated by the U.S. This may simply indicate a trend toward online skill assessment for non-IT skills, which are most often trained and assessed in more traditional venues (e.g., on-the-job, in training workshops).

Although the media continues to report in sometimes alarming fashion the tremendous loss of jobs overseas, particularly in the technology sector, the most recent survey of IT job growth by Robert Half International¹ reports a net 11% increase in IT hiring in the U.S., the largest in three years. In terms of specific skills, 77 percent of Chief Information Officers (CIO's) reported a need for Microsoft Windows (NT/2000/XP) administrators. Wireless network management also was a sought-after specialty, receiving 48 percent of the responses. Forty-seven percent of executives named SQL Server management as a specialty in short supply.

FINDING 2

India is Tops Outside the U.S.A.

For many, the first location that comes to mind when one mentions outsourcing is "India." In total numbers, India easily finished second to the United States in 2005 Brainbench Global Certifications – supporting the fact that they are the number one offshore support (or, "outsourcing") country in the world.

India overtakes the U.S. in Java competency

Whereas the U.S. led IT certifications in 24 of 30 categories (See Appendices), India led the other six, including all three categories pertaining to Java software development: Java 2 Fundamentals, Java 2, and Java Server Pages (Figures 1a – 1c). India has

been a hotbed of Java development expertise since the turn of the century. But they also led certifications in ASP.NET, the C programming language, and RDBMS concepts. For each of these skills, India accounted for at least 37% of the world's certifications.

FIGURE 1a: Certifications for Java 2 Fundamentals

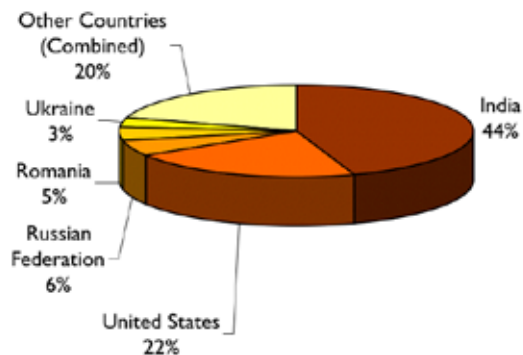


FIGURE 1b: Certifications for Java 2

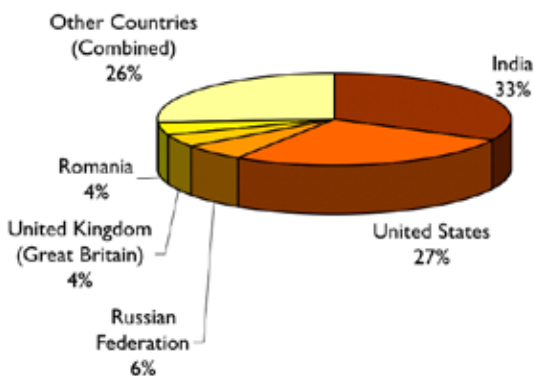
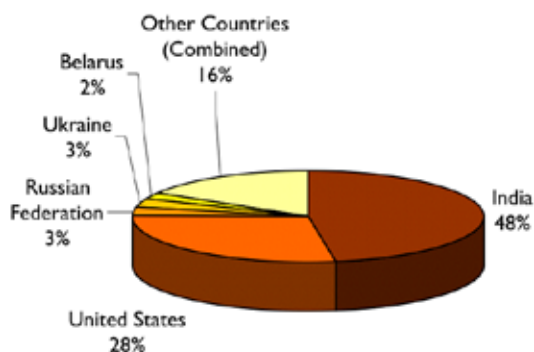


FIGURE 1c: Certifications for Java Server Pages (1.2)



Will it last?

India's penetration into the high tech world has been dramatic and large-scale. For example, Sun Microsystems (the creator of Java) plans to double

its staff in India over the next year. But, they expect the wage advantage to gradually go away, and are increasing staff in China, Russia, and the Czech Republic as well. This reflects forces – both within and outside of India – that have fueled competition for India's outsourcing dominance.

First, India has initiated a new 36% corporate income tax on non-Indian IT firms operating in that country. Other experts note that India's IT growth has been so rapid and uneven that prices have risen and qualified labor availability there has fallen. And once prices go up, and the seemingly bottomless pool of labor shows limits, things are bound to change.²

Firms in Asia have begun to directly target India's dominance as well. For example, service providers in Pakistan are launching an aggressive sales and marketing challenge in some business sectors, and Indian firms are even building facilities in China and the southern United States.



FIGURE 2: Percentage of population having received certifications between May 1, 2004 to April 30, 2005

Country	Certifications	Population (est. 2005)	Certifications as % of Population
Russian Federation	16037	143,420,309	.011%
Romania	12720	22,329,977	.057%
Ukraine	10551	47,425,336	.022%
Bulgaria	5276	7,450,349	.071%
Latvia	4742	2,290,237	.207%
Belarus	3724	10,300,483	.036%

FINDING 3

Eastern Europe Challenges the World

The map of global skills is not singularly dominated by the U.S. or the Indian subcontinent. Six of the top 11 countries are from Eastern Europe (Russia, Ukraine, Romania, Bulgaria, Latvia, and Belarus.) The development and sourcing of skills, particular in the IT world, has tremendous potential in Eastern Europe.

The Russian Federation is clearly dominant in Eastern Europe, with 16,037 skill certifications. But Romania and Ukraine weren't far behind, with 12,720 and 10,551 certifications, respectively. Bulgaria, Latvia, and Belarus comprise the rest of the former Soviet juggernaut. Figure 2, which calculates the number of certifications as a percentage of total population, underscores these trends.

The Russian Federation is quite strong in several growing areas, placing in the Top 5 in most IT categories but particularly present in open source programming languages such as Unix, Linux, and in the important networking protocol of TCP/IP Administration. Its well-educated population is clearly in learning mode as well, with extensive certification in the Computer Fundamentals categories and Written English.

Not to be outdone by their giant neighbor to the north, Romania and Ukraine proved their mettle in those same categories as well. Moreover, both ranked high in the SQL certification (specifically, SQL (ANSI) Fundamentals, SQL (ANSI), and MS SQL Server 2000 Programming). In addition, PHP 4 and HTML were popular in both countries.

According to IT Business Edge³, "The Ukraine benefited from an educational and research and development program implemented under the USSR, and which has continued on through to today. Despite some funding cuts after the nation achieved its independence, the programs are continuing to create a nation with a heavy emphasis on math and sciences. Companies such as EDS are finding such workers particularly adept in the areas of programming and software development."

Bulgaria, Latvia, and Belarus, while on a smaller scale, definitely made their presence known. They were strong in all IT categories, particularly PHP (Latvia), C++ (Belarus), and Linux (Bulgaria). As detailed above, Latvia ranked highest among all countries in certifications per population. However, each of these countries appears to be active in most programming and network administration categories.

FINDING 4

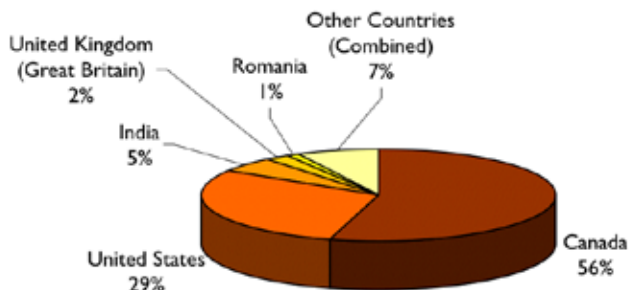
Canada is Second to the U.S. in Western Hemisphere Certifications

Canada, Brazil and Mexico are the most popular Western Hemisphere hubs after the United States. However, Canada is the only one that appeared near the top in any of the skill certifications.

Is Canada becoming the ideal hub for customer support?

Canada ranked in the Top 5 in Computer Technical Support, Outbound Sales Skills (Figure 3), Network Technical Support, and Listening Skills. The numbers indicate that there could be a perceived advantage to a native English-speaking Canadian workforce more closely associated with the U.S. in high-touch customer situations.

FIGURE 3: Certifications for Outbound Sales Skills



Cost savings can't possibly mimic the savings associated with India, Russia etc. (where workers earn no more than 20% of equivalent American employees), though price-of-entry is certainly lower than down in the states. According to a recent piece in the *East Bay Business Times*⁴, "Companies that offshore IT work to China or India are saving 20 percent to 30 percent over U.S. expenses, while those sending work to "nearshore" destinations such as Canada or Mexico are saving only 10 percent to 15 percent", reports San Ramon's neolT.

But many companies feel more comfortable with a workforce more familiar with American business practice. The report continues, "many firms

choose to go to Canada, where the relatively high salaries – \$25,338 for an entry level IT employee to \$62,164 for a manager – are justified by the ability to locate operations in smaller cities where real estate is cheap."

Mexico and Brazil made the top 25, though few clear patterns of skill development emerged. Brazil's most popular skill certification was Linux Administration, while Mexicans participated in a variety of Computer Fundamentals assessments.

FINDING 5

Western Europe is Holding Steady

Though the findings in these pages suggest that the typical computer programmer is more likely to live in Bangalore or St. Petersburg and not Birmingham or Stuttgart, the UK and the rest of Western Europe is certainly active in developing IT and related workplace skills.

Western Europe is often categorized as an out-sourcer, not as a recipient of new business or growing in the tech sector. But the United Kingdom and Germany both appeared in Brainbench's top 20 for overall skill certifications. Specifically, the UK ranked 7th in total certifications, with the most popular being C# and C++. Germany ranked 15th, with Linux Administration its most popular certification. Germany has even been cited as an out-sourcing destination. In early 2003, Advanced Micro Devices (AMD), a chipmaker based in Sunnyvale, California, opened a factory in Dresden.

Even with their own share of skilled workers available, the U.K. is the 2nd largest outsourcer after the U.S. The U.K. is expected to remain the largest European consumer of offshore services with India the main destination, but France and Germany are increasingly turning to locations like Spain, the Czech Republic, Russia and Tunisia⁵.

Still, there is concern growing in various occupational communities that countries like the UK, France, Germany, and the United States must demonstrate value and carve out niches in very specific aspects of business process outsourcing (BPO). For example, a report by the British Computer Society⁶ suggests that IT professionals there focus on services that are required to be near home companies, high value services, and ensure that their work meets international quality standards.

FINDING 6

Southeast Asia Remains a Strong Option

With all the talk of India, it's easy to forget that Southeast Asia has been a bastion of desirable skills – and an offshoring destination – since the end of World War II. Manufacturing has led the way in most Asian countries, but more high tech and documentation services are growing. Even Indian firms are buying or building operations in China and other Asian locations.

Comparisons between Brainbench's 2003 report and the current study reveal some changes in the landscape. For example, in 2003 Australia made the Top 10. This year they are at #14 with only 55% of the certifications they had previously. Both the Philippines and Indonesia now outrank them.

The Philippines, Malaysia and Singapore all scored well, supporting the fact that they represent some of the top offshore companies from Asia. All of them have historically strong English-speaking ties via the U.S. and U.K. (as does India). For example, Rob O'Malley, a call center expert for CRM Today, predicts that the Philippines will overtake India in number of call center agents employed, especially in serving the U.S. market. In addition, there is a fairly sizable Spanish-speaking population⁷. Along with relative continued prosperity and stability they also provide cost effective sources of labor.

Focus on Offshoring: Now boarding to all destinations

This report – as a whole – has implications for offshoring, but the growth of skills around the world is not just a product of western companies sending skills overseas. While we can make some educated guesses as to the reasons behind the numbers, more scientific methods should be used to understand the full implications.

With dozens of choices for offshoring locations, and foreign firms willing to help, where should a company look to build its global expertise? The answers are not obvious, and seem to change every day.

For American, Canadian, and British companies, much BPO requires English-speaking employees with a basic education – available in abundance in most countries where English is spoken. But English language skills, though growing rapidly, are not the only impetus for selecting a particular location. And neither is cost.



The Economist Intelligence Unit's 2005 ranking of offshoring locations⁸ is instructive. This study measured the attractiveness of 60 countries as destinations for offshoring, scoring each country on nine criteria commonly used by companies when deciding where to offshore. Countries were scored on labor costs, labor skills, labor regulation, proximity to major sources of investment, political and security risk, macroeconomic stability, regulatory environment, tax regime, and infrastructure.

The global ranking (GR) of top locations for offshoring, contrasted to the country's rank on number of Brainbench (BB) certifications, is as follows:

GR	Score	Country	BB Rank
1	7.76	India	1
2	7.34	China	54
3	7.26	Czech Republic	31
4	7.25	Singapore	24
5	7.24	Poland	16
6	7.23	Canada	5
7	7.19	Hong Kong	76
8	7.17	Hungary	53
9	7.17	Philippines	8
10	7.16	Thailand	60
11	7.13	Malaysia	21
12	7.12	Slovakia	30
13	7.09	Bulgaria	7
14	7.08	Romania	3
15	7.08	Chile	74

In the example, the Economist scores don't mesh with the growth trends expressed in the Brainbench rankings. China ranks low on Brainbench's rankings, most likely due to its low emphasis on English competency, while countries like the Czech Republic, Singapore, Poland, Hungary, Thailand, Malaysia, and Slovakia may be small, but enjoy strong perceptions of their competence. The relatively high rank of Chile, tops in South America, reflects its recent stability and tireless attempts at maintaining an attractive business climate.

While it is true that certification testing requires internet access, that same requirement would be a factor when considering the attractiveness of an outsourcing location. Though "internet access" in the U.S. seems synonymous with "has a PC at

home", many individuals likely accessed the tests at work; so individual access to the internet may not actually be relevant to rankings when discussing offshoring.

These ratings (based on a survey of 500 CIO's) highlight positive impressions of India as an offshoring destination, mostly due to its vast pool of educated English-speaking professionals, low labor costs and navigable legal system. It also reflects the deep experience with India and relationships built with its firms. China barely holds second place, due to its "cheap and plentiful labor supply and fast-improving infrastructure, but lags behind India because of its relative lack of English skills, cultural barriers and a weak legal system" according to the Economist.

The report views Eastern Europe as benefiting as well. Although Eastern Europe (some of whose business leaders are launching a campaign to be referred to as "Central Europe") is only beginning to get noticed as an offshoring destination, the ranking indicates that the region is destined to become a major offshoring hub. The Czech Republic scores third in the Economist rankings (albeit by a small margin) due to a relatively low-cost skilled labor force, an attractive regulatory environment, as well as close proximity and cultural ties to Western Europe. In contrast, it ranks quite low in the Brainbench rankings, possibly due to a smaller proportion of English-speaking, technically educated workers relative to some of its neighbors.

Canada was rated as the most attractive westernized country. It features a highly attractive business environment, but also has relatively low labor costs for a developed country. In addition, the Economist comments: "Canada benefits from close proximity to the U.S., while its highly skilled work force and excellent infrastructure make it particularly attractive for knowledge-intensive activities."

So while the large quantity of data analyzed for this report lends itself to uncovering some trends and findings, it is by no means conclusive. There are many other factors to consider in regards to the hot button of offshoring.

Top Skills Around the Globe

The most popular skills for job function (IT only) are listed below. Specific trends within these data are discussed in subsequent sections.

IT – Database Development and Administration

1. RDBMS Concepts
2. Oracle PL/SQL
3. SQL (ANSI) Fundamentals
4. SQL (ANSI)
5. MS SQL Server 2000 Programming

IT – Programming and Development

1. C++
2. Java 2 Fundamentals
3. C++ Fundamentals
4. C
5. C#

A recent survey adds insight to these findings:

The TCP (TIOBE Programming Community) Index 2004 ranked the Top 10 Programming Languages⁹:

1. C 19.79%
2. Java 16.33%
3. C++ 11.91%
4. PHP 11.45%
5. (Visual) Basic 8.17%
6. Perl 7.42%
7. SQL 3.45%
8. Python 3.03%
9. Delphi/Kylix 2.98%
10. C# 1.95%

IT – Systems and Network Administration

1. Networking Concepts
2. Linux Administration (General)
3. Unix Administration (General)
4. Internet Security
5. MS Windows Server 2003 Administration

IT – Technical Support

1. MS Windows XP Desktop Administration
2. Computer Technical Support
3. Technical Help Desk

4. Computer Electronics
5. Network Technical Support

IT – Telecommunications

1. Cisco Network Support
2. Telecommunications Industry Knowledge
3. LAN/WAN Communications
4. IP Routing & Switching
5. WAN Technologies

IT – Web Development and Administration

1. ASP.NET
2. HTML 4.0
3. PHP 4
4. Java Server Pages (JSP 1.2)
5. Web Design Concepts

FINDING 7

U.S. More on High Alert – The Security Factor

Three of the top five Systems and Network Administration subcategories in the United States pertained to security, as opposed to only one subcategory internationally. These three categories are: Disaster Recovery and Planning, Internet Security, and Information Technology Security Fundamentals. Only Internet Security ranked in the top 5 internationally.

There are four primary explanations for this phenomenon. First, there are heightened security concerns in the face of threats by both natural and unnatural disasters. The events of 9/11 as well as hurricanes in the Southeast have fed the perceived need for greater system backup and security plans. In addition, there is greater awareness of the damaging effects of computer viruses and hacking. Relatedly, there has been recent political and public outcry about data security and calls for regulation regarding not only the protection of company and individual data but reporting of data theft. Finally, IT firms are increasingly under pressure to provide evidence of their capability to back-up data and support parallel processes (e.g., back-up servers).



FINDING 8

Linux and UNIX Overtake Microsoft OS

At a global level, Linux Administration (General) and Unix Administration (General) were more popular skill certifications than MS Windows Server 2003 Administration. This reflects a growing trend toward open-source coding. Linux is a free, open-source operating system, and UNIX is a traditional networking system present in mainframe computers dating to the late 1950's. Once viewed as a complex, user-unfriendly platform, Linux is now as easy-to-use as the Microsoft product, and viewed as superior by its ardent followers.

Interestingly, in 2001, 64% of all Brainbench certifications between these two OS's were for Windows, and 36% were Linux/Unix; in 2005, 50.4% were Windows and 49.6% were Linux/UNIX. During that time, U.S. Windows certifications shrunk from 67% to 57%, while internationally Linux/Unix share grew from 38% to 52% of all certifications.

The Russian Federation led India in both Linux and UNIX, but the United States was still the clear leader in these areas. Romania, Ukraine, and Bulgaria – as well as the United Kingdom – were also centers of Linux and UNIX certification.

Linux and UNIX have traditionally provided an easier point-of-entry and level of support than Microsoft for many professionals in other countries, especially Eastern Europe and Asia. Specifically, the use of Linux and UNIX are cited as more cost-effective than Microsoft products.

FINDING 9

Microsoft Software Dominates Global Skill Certification

Not surprisingly, Computer Fundamentals tests for Windows versions 95/98/2000/XP, MS Word and Excel Fundamentals are, by far, the most popular certifications throughout the world.

Furthermore, there were nearly 12 people certified worldwide in Computer Fundamentals (Win XP) to every one person certified in Computer Fundamentals (Mac OS X), the next closest competitor. Moreover, there was a 62-to-one ratio of individuals certified in MS Word 2002 Fundamentals versus Corel Wordperfect 9.0. In all fairness, the Wordperfect test is a couple versions old. Regardless, the variance is quite daunting. Whereas Microsoft is getting a serious challenge in the OS world, their hold on computer software is firm, to say the least.

Notwithstanding this fact, the U.S. has a big lead in XP certifications. In general the U.S. is earliest to adopt newer versions of software packages, particularly standard Microsoft products, while continuing to support multiple versions of all software.

The great number of basic certifications could indicate that companies are concerned about employees having the most basic computer skills.

Therefore, the great number of these certifications may simply reflect the need for job applicants to provide prospective employers with proof of competence.

Most Popular Software Certifications

1. Computer Fundamentals (Win XP)
2. Computer Fundamentals (Win 95/98)
3. Computer Fundamentals (Win 2000)
4. MS Excel 2002 Fundamentals
5. MS Word 2002 Fundamentals

FINDING 10

The Movement Toward Online Certification of “Soft Skills” is Primarily U.S.-based

A whole new category of skills assessments – those often known as soft skills – have been added to the Brainbench library since 2001. Individuals taking advantage of these assessments were found primarily in the U.S. and Canada. For example, at least 65% of certifications in Managing People, Office Management, Coaching, and Telephone Etiquette were performed in the U.S.

Another interesting trend appears to be tied to major scandals of the past few years in the United States, as two of the five most popular management-level certifications achieved during the study were directly related to ethics – Sexual Harassment Awareness (U.S.) and Business Ethics Awareness (U.S.). On the other hand, much of the world lacks formal guidelines and penalties related to ethics and sexual harassment, so this trend may simply reflect regulatory patterns.

These results, while meaningful, may more accurately reflect the medium than the skills. This represents a small, but growing trend toward web-based people and soft skills training platforms. Even the Telephone Etiquette category is dominated by U.S. employees, and this is certainly considered to be a

soft skill, though it has an obvious application to IT support. Online training, which has been available for nearly a decade in almost every workplace skill area, may be ramping up slowly. Judging by the lack of certifications outside of the United States, this may be a very long, flat ramp.

FINDING 11

Health Care Going Global?

A trend vaguely hinted at in the data, but more widely reported elsewhere, is the potential for outsourcing in the health care world. Whereas the U.S. led health-related certifications worldwide, India, Canada and Eastern Europe appear to be making inroads. For example, the U.S. was number one in Medical Terminology with 1,520 (72%), but India was second with 201 (10% of the global total.)

To be sure, health care providers as well as insurance companies are being pressured to hold down costs. And document-heavy operations, such as medical records coding and related administrative tasks, are being carefully evaluated for potential cost savings. As reported by the International Association of Outsourcing Professionals (IAOP)¹⁰, the U.S. will need 5.3 million new health care workers by 2012 and document process outsourcing (DPO) is a key part of that growth.

Within the U.S., Texas led other states by a wide margin in Medical Terminology certifications, with 167, or 12% of the total. California was second with 7% of certifications.

THE STATE OF THE STATES

With overall U.S. certifications dropping 23% since our 2003 Global Skills Report, certifications within each state are also lower on the whole. To get an idea of some of the shifts, the table below lists the top 10 for 2005.

FIGURE 3: Top ten U.S. States ranked by position in 2005

	Certifications	Position ('03)
1. California	10163	(1)
2. Texas	8733	(2)
3. Florida	6957	(4)
4. New York	5502	(5)
5. Virginia	5419	(11)
6. Illinois	5360	(10)
7. Pennsylvania	4953	(9)
8. New Jersey	4680	(7)
9. Ohio	4218	(8)
10. Georgia	3682	(12)

More data on increases in certifications in the South is discussed in Finding #13.

FINDING 12

No state is dominant

Whereas the number of state certifications in 2005 does reveal some skill hotbeds, these rankings don't tell the whole story. First, the data reflects the larger populations of the top states, as well as the high tech dominance of California. In addition, in only rare cases does a state dominate a particular category of skills or specific certifications.

Some trends do emerge. Georgia and Virginia have both enjoyed dramatic growth in the respective

economies, and are increasingly enjoying status as centers of high tech skills. This growth is reflected in their ascendance in the Brainbench rankings.

In terms of concentrations of skills, Illinois emerged as a surprising center for IT programmers within the U.S., ranking in the top 5 for all Programming and Development leading skills. While this is partially due to Illinois' high population, there appears to be a concentration of C++ skill certifications as well as MS Windows Server 2003 Administration. In fact, 18% of the country's C++ certifications were for employees located in Illinois; this represented the highest concentration of ANY skill in the U.S. California also emerged as a center of C++ and C# skills, and Texas dominated the ASP.NET rankings, albeit with only 15% of certifications in the U.S.

The fact that no state accounted for greater than 18% of a particular skill certification, with most under 10%, underscores the fact that there are many areas ripe for the new 'inshoring' thinking of sourcing labor pools in more economically friendly areas, perhaps in the rural regions. The global diversity of skills applies equally to American shores.

FINDING 13

The South is Rising Again

The U.S. regions with the most certifications were respectively: The South, The Northeast, The Midwest, and the West. The rankings were determined by the number of total certifications by a region compared against the population numbers for the region, thus leveling the playing field against the more heavily populated southern region – but clearly that did not matter – the South still led the way both overall and as a percentage against their region's overall population.

This may reflect a general population shift to the south (including the southwest.) In addition, there

are recent reports of trends in 'outsourcing' to rural areas, sometimes called "inshoring." For example, a recent InformationWeek article¹¹ reports a sentiment toward attempting to keep IT work in the U.S. by searching for low cost locations and workers. A U.S.-based firm called Rural Sourcing estimates programming work in southern areas at \$38 to \$45 per hour, compared to a cited \$80 for San Francisco.

In an interesting twist on the offshoring concept, Indian firms are actually building outsourcing centers within the United States in order to fill demand by companies who want to lower costs but don't want to offshore any business processes. For example,

Tata Consulting Services (TCS),
based in Mumbai, India,
has built a training center in
upstate
New

York, and plans to hire approximately 1,000 U.S. based employees this year.

In contrast, the survey of IT job growth by Robert Half¹² reports the most job growth in the IT sector is in the New England region, not the south. However, a close examination of projected job growth reveals diversity in growth across several regions that could be referred to as "The South." The area called "South Atlantic", including Delaware, DC, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia is slated for net 13% growth. In contrast, the area known as "East South Central", including Alabama, Kentucky, Mississippi, and Tennessee, is projected to grow at a rate of only 3%.

Nonetheless, the west represents one of the smaller net growth areas in the Robert Half study. California is in the midst of a nationally-reported budget crisis and has acknowledged that it needs to work hard to become more attractive to businesses. Coupled with a high cost of living, neither inshoring nor offshoring trends include much Western growth.



CONCLUSION

What Does the Future Hold?

If one thing is clear from these rankings, it's that we really have a global technology community. Some of the most complex and valuable workplace skills are available not only in Nebraska, but Nigeria. As an employer, where can you look for fresh talent and ideas? Nearly anywhere.

The proliferation of high-level skills around the world – and the commensurate availability of jobs – is often discussed in the alarming context of job losses in the U.S. As with electronics, shoes, and automobile manufacturing, opportunities for certain skill sets seem to be evaporating on these shores. The Conference Board study¹³ notes that as the number of high school and college graduates selecting high technology careers does not grow, and work visas are limited for immigrants wanting to come to the U.S. to work, the U.S. simply won't be able to meet demand for IT employees. A similar situation exists in the United Kingdom, according to the same report.

With a truly global skills market growing everyday, the following trends are likely to continue:

I. More jobs outsourced in general

The Economist report, cited earlier, concludes that companies will redistribute more service functions to Asia and Eastern Europe over the next three years. Only a few developed countries emerge as attractive offshoring locations, with Canada heading the list of so-called OECD (Organization for Economic Co-operation and Development. See website: <http://www.oecd.org/>) countries.

In the U.S., outsourcing work in general, and offshoring in particular, appears to be growing, not slowing. This mirrors a trend in Western Europe. Forrester Research¹⁴ has reported that a quarter of European companies have outsourced some IT or business services to offshore locations. By 2009 Forrester predicts that the UK will account for more than 75 per cent of the £2.38 billion (\$4.1 billion) of Western European spending on offshore

outsourcing. IT services provided to Europe from overseas will grow from £726 million (\$1.4 billion) in 2004, increasing by 27 percent each year.

2. Wage gaps will shrink as the Eastern bloc and Asia prosper.

The globalization of skills, particularly that part of the phenomenon caused by BPO from Western firms, would never have happened without an obvious cost savings. These can be dramatic. For example, a report by Pierre Audoin Consultants (cited on Silicon.com) pegs the price of a “recently qualified graduate from an approved specialist university” in Romania at \$6,500 per year. Entry-level tech workers in Vietnam earn \$3,276 per year (<http://www.zdnetindia.com/news/features/stories/122833.html>.) But things change.

It will be interesting to see how the situation in India, mentioned in a previous section, plays out. Increasing wages and inflation (14% in 2003), skill shortages, and a new corporate tax structure are driving up costs. Pakistani business leaders, in particular, are seizing opportunities to introduce Western organizations to mid-level (not freshly graduated) programmers who make as little as \$6 per hour. Moreover, India is emerging as a leading center of technological innovation, not just a recipient of instructions from firms outside its borders.



Even China, which could be regarded as a veteran offshoring destination, may benefit from skill shortages in India and the U.S. Some Indian firms have begun offshoring engineering work to China. According to the Conference Board report (cited earlier), the huge population of China and its vast untapped population of engineering graduates will, for the time being, prevent an India-like rise in costs.

3. Green Acres is the Place to be

High technology has always loved the hinterlands. But simple cost comparisons with the rest of the world, and low-cost communication options, point toward even less skill growth in cities and even more exploitation of low-rent rural and Southern suburban locations.

As mentioned earlier in this report, even Indian firms are outsourcing their own work to rural U.S. locales. There are no indications of this trend reversing as long as rents in the largest American cities either remain at a high rate or grow.

4. Skills flow in all directions

Entrepreneurialism, as well as local labor pools, will continue to influence the proliferation of high technology skills around the globe. As with the data in this report, it is difficult to dissect the influence of outsourcing from Western companies and the generation of work from within outsourced destinations.

5. Skills will “find their proper place”

It is generally easier for companies to do business in countries where they know the landscape, and where local officials are used to the specific work being done in that area. This is somewhat of an Achilles

Heal for companies operating in countries with difficult political or business climates. “India and China are already the leading destinations for offshoring, and have the potential to win an even bigger share of offshoring projects if they address remaining weaknesses in their business environments,” says Daniel Franklin, Editorial Director of the Economist Intelligence Unit.

As learning and increased education emerges in other parts of the globe, increased prosperity leads to inflation, and disappearing pricing advantages. In this way, offshore firms will have to demonstrate value beyond mere cost savings. To some extent, this has already occurred. In the late '90's, horrific and tedious implications for many companies' IT personnel led to outsourcing of programming tasks to ensure Y2K compliance and avoidance of (depending on your opinion) interruptions in software performance or global catastrophe. The Indian firms, specifically, demonstrated their competence to many Western companies and soon won non-Y2K work.

However, as many aspects of the high tech world mature, it seems natural that epicenters of specific skills will develop. In spite of reported general satisfaction with outsourced work, a 2004 Booz Allen surveys reports that “more than 30% of respondents reported being less than satisfied with their outsourcing results.” Moreover, the Conference Board study reports that half of all offshoring operations are destined to fail. Therefore, it

may be that certain skills are simply best found in certain places. The U.S.,

Western Europe, and Canada may yet emerge as centers of expertise in specific existing high technology sectors (e.g., data security) as well as areas yet to be invented or developed.



APPENDICES

A-I: Country ranking based on number of certifications received

1	United States	125722	48	Norway	308	94	Oman	44	140	Malawi	6
2	India	60771	49	Switzerland	298	95	Bahamas	42	141	Lesotho	6
3	Russian Federation	16037	50	Croatia	293	96	Ecuador	38	142	Haiti	6
4	Romania	12720	51	Argentina	289	97	Guam	37	143	Gabon	6
5	Ukraine	10551	52	Bosnia and Herzegovina	281	98	Ghana	36	144	Cayman Islands	6
6	Canada	8872				99	Mauritius	35	145	Bhutan	6
7	United Kingdom (Great Britain)	8093	53	Vietnam	278	100	Korea, Republic of	34	146	Antigua & Barbuda	6
8	Bulgaria	5276	54	Hungary	272	101	Honduras	33	147	Libya	5
9	Philippines	4795	55	China	270	102	Zimbabwe	32	148	Benin	5
10	Latvia	4742	56	Finland	258	103	Myanmar	32	149	Sierra Leone	4
11	Belarus	3724	57	Colombia	254	104	Luxembourg	31	150	Seychelles	4
12	Indonesia	3562	58	Turkey	250	105	Malta	28	151	Palau	4
13	Pakistan	3235	59	Kuwait	249	106	Uganda	22	152	Macau	4
14	Australia	2635	60	Azerbaijan	245	107	Botswana	22	153	Isle of Man	4
15	Germany	2139	61	Thailand	239	108	Bolivia	22	154	Eritrea	4
16	Lithuania	1805	62	Uzbekistan	236	109	Tanzania, United Republic of	21	155	Cameroon	4
17	Poland	1330	63	Bangladesh	234	110	Morocco	21	156	Cambodia	4
18	Brazil	1168	64	Greece	231	111	Mongolia	20	157	British Virgin Islands	4
19	South Africa	1082	65	Japan	219	112	Barbados	20	158	Algeria	4
20	Armenia	939	66	Cuba	208	113	U.S. Minor Outlying Islands	17	159	Suriname	3
21	Mexico	937	67	Kyrgyzstan	193	114	Bermuda	17	160	Rwanda	3
22	Malaysia	909	68	Albania	174	115	Afghanistan	15	161	Mozambique	3
23	Italy	889	69	Austria	170	116	Tajikistan	14	162	Liberia	3
24	Estonia	883	70	Puerto Rico	162	117	Dominican Republic	14	163	Greenland	3
25	Singapore	881	71	Jordan	138	118	Saint Lucia	13	164	Gambia	3
26	New Zealand	844	72	Portugal	136	119	Guyana	13	165	Channel Islands	3
27	Netherlands	746	73	Venezuela	133	120	American Samoa	13	166	Turks & Caicos Islands	2
28	France	722	74	Islamic Republic of Iran	131	121	Brunei	12	167	Sudan	2
29	United Arab Emirates	664	75	Chile	119	121	Angola	12	168	Somalia	2
30	Sweden	589	76	Cyprus	118	123	Tunisia	11	169	Northern Mariana Islands	2
31	Slovakia	580	77	Hong Kong	114	124	El Salvador	11	170	Madagascar	2
32	Czech Republic	564	78	Uruguay	97	125	Zaire	10	171	Faroe Islands	2
33	Moldova	562	79	Iceland	97	126	Namibia	10	172	Vanuatu	1
34	Israel	553	80	Qatar	95	127	Iraq	10	173	Turkmenistan	1
35	Slovenia	533	81	Peru	94	128	Ethiopia	10	174	Togo	1
36	Belgium	528	82	Bahrain	87	129	St. Kitts and Nevis	8	175	Pitcairn	1
37	Saudi Arabia	520	83	Syrian Arab Republic	80	131	Fiji	8	176	Micronesia	1
38	Sri Lanka	505	84	Lebanon	80	132	Zambia	7	177	East Timor	1
39	Yugoslavia	479	85	Nepal	75	133	Yemen	7	178	Burkina Faso	1
40	Egypt	428	86	United States Virgin Islands	68	134	Paraguay	7	179	Belize	1
41	Kazakhstan	422	87	Jamaica	55		Netherlands Antilles	7			
42	Ireland	393	88	Taiwan	53	135	Guatemala	7			
43	Georgia	362	89	Trinidad & Tobago	51	136	Reunion	6			
44	Denmark	360	90	Panama	50	137	Papua New Guinea	6			
45	Spain	348	91	Costa Rica	50	138	Nicaragua	6			
46	Macedonia, Republic of	323	92	New Caledonia	47	139	Maldives	6			
47	Nigeria	319	93	Kenya	46						

B-I: Country Skill Rankings (Top 5) *Presented in order of popularity*

IT – Database Development and Administration

RDBMS Concepts

India	38%
United States	26%
Russian Federation	5%
Romania	4%
Ukraine	4%

Oracle PL/SQL

United States	34%
India	34%
Russian Federation	7%
United Kingdom (Great Britain)	4%
Ukraine	3%

SQL (ANSI) Fundamentals

United States	34%
India	24%
Russian Federation	8%
Ukraine	6%
Romania	6%

SQL (ANSI)

United States	27%
India	15%
Russian Federation	11%
Ukraine	8%
United Kingdom (Great Britain)	6%

MS SQL Server 2000

Programming

United States	41%
India	20%
Russian Federation	8%
Romania	6%
Ukraine	5%

IT – Programming and Development

C++

United States	26%
India	20%
Russian Federation	13%
United Kingdom (Great Britain)	8%
Ukraine	7%

Java 2 Fundamentals

India	45%
United States	22%
Russian Federation	6%
Romania	5%
Ukraine	3%

C

India	39%
United States	15%
Russian Federation	11%
Romania	7%
Ukraine	6%

C#

United States	36%
India	17%
Russian Federation	10%
United Kingdom (Great Britain)	8%
Ukraine	6%

Java 2

India	33%
United States	27%
Russian Federation	6%
United Kingdom (Great Britain)	4%
Romania	4%

IT – Systems and Network Administration

Networking Concepts

United States	36%
India	14%
Russian Federation	7%
Romania	5%
Ukraine	5%

Linux Administration (General)

United States	23%
Russian Federation	11%
India	10%
Romania	7%
Ukraine	6%

Unix Administration (General)

United States	37%
Russian Federation	13%
Ukraine	10%
India	9%
Romania	3%

MS Windows Server 2003

Administration

United States	38%
India	11%
Russian Federation	8%
Ukraine	5%
Canada	4%

TCP/IP Administration

United States	24%
Russian Federation	14%
Ukraine	11%
Romania	7%
India	6%

B-2: Country Skill Rankings (Top 5) *Presented in order of popularity*

IT – Technical Support

MS Windows XP Desktop

Administration

United States	48%
India	6%
Canada	6%
Ukraine	5%
Romania	5%

Computer Technical Support

United States	44%
India	9%
Russian Federation	7%
Canada	4%
Romania	4%

Technical Help Desk

United States	57%
Canada	6%
Romania	3%
United Kingdom (Great Britain)	3%
India	3%

Computer Electronics

United States	44%
India	12%
Russian Federation	5%
Romania	4%
Canada	4%

Network Technical Support

United States	36%
India	14%
Russian Federation	8%
Romania	4%
Canada	4%

IT – Telecommunications

Cisco Network Support

United States	37%
India	19%
Russian Federation	8%
Romania	5%
Ukraine	4%

Telecommunications Industry

Knowledge

United States	36%
India	16%
Russian Federation	8%
Ukraine	8%
Romania	6%

LAN/WAN Communications

United States	31%
India	13%
Russian Federation	10%
Ukraine	8%
Romania	7%

IP Routing & Switching

United States	21%
India	17%
Russian Federation	11%
Ukraine	7%
Romania	7%

WAN Technologies

United States	33%
India	23%
Romania	7%
Russian Federation	5%
Ukraine	5%

Web Development and Administration

ASP.NET

India	39%
United States	39%
Russian Federation	3%
Romania	3%
Ukraine	2%

HTML 4.0

United States	30%
India	16%
Ukraine	7%
Russian Federation	7%
Romania	6%

PHP 4

United States	15%
Russian Federation	13%
India	11%
Ukraine	11%
Romania	10%

Java Server Pages (JSP 1.2)

India	47%
United States	28%
Russian Federation	3%
Ukraine	3%
Belarus	2%

Web Design Concepts

United States	42%
India	9%
Romania	6%
Russian Federation	6%
Ukraine	5%

B-3: Country Skill Rankings (Top 5) *Presented in order of popularity*

Finance

Accounts Payable Fundamentals

United States	46%
India	21%
Philippines	8%
Pakistan 136	6%
Canada 123	6%

Accounts Receivable/Billing Fundamentals

United States	64%
India	14%
Canada	6%
Pakistan	2%
South Africa	1%

Bookkeeping Fundamentals (U.S.)

United States	63%
India	13%
Pakistan	6%
Canada	6%
South Africa	2%

Financial Accounting (U.S.)

United States	50%
India	15%
Pakistan	10%
Philippines	6%
Canada	4%

Payroll Fundamentals (U.S.)

United States	93%
Canada	3%
Pakistan	2%
India	1%
Algeria	1%

Management

Project Management (2000)

United States	47%
India	24%
Canada	3%
Pakistan	3%
Ukraine	3%

Managing People (U.S.)

United States	70%
India	8%
United Kingdom (Great Britain)	3%
Canada	3%
Romania	2%

Office Management (U.S.)

United States	83%
India	4%
Canada	3%
United Kingdom (Great Britain)	1%
Pakistan	1%

Sexual Harassment Awareness (U.S.)

United States	85%
Canada	2%
India	2%
Romania	1%
Australia	1%

Coaching

United States	66%
India	5%
Canada	5%
United Kingdom (Great Britain)	4%
Romania	2%

Customer Support

Typing Speed & Accuracy

United States	66%
India	11%
Canada	7%
United Kingdom (Great Britain)	2%
Philippines	2%

Written English

United States	41%
India	17%
Romania	6%
Russian Federation	5%
Philippines	4%

Listening Skills

United States	52%
India	10%
Romania	5%
Canada	4%
Ukraine	3%

Telephone Etiquette

United States	74%
Canada	4%
India	3%
United Kingdom (Great Britain)	3%
Romania	2%

Customer Assistance

United States	76%
Canada	4%
India	3%
United Kingdom (Great Britain)	2%
Russian Federation	2%

B-4: Country Skill Rankings (Top 5) *Presented in order of popularity*

Sales & Marketing

Marketing Concepts

United States	38%
India	18%
Canada	10%
Romania	5%
Pakistan	4%

Marketing Strategy

United States	39%
India	16%
Romania	8%
Latvia	4%
Bulgaria	3%

Sales Concepts (U.S.)

United States	71%
India	8%
Romania	5%
Canada	3%
Latvia	1%

Negotiation Strategy

United States	56%
Romania	10%
India	7%
Canada	7%
Bulgaria	2%

Outbound Sales Skills

Canada	55%
United States	29%
India	5%
United Kingdom (Great Britain)	2%
Romania	1%

Most Popular Software

Computer Fundamentals

(Win XP)

United States	46%
India	10%
Romania	5%
United Kingdom (Great Britain)	3%
Canada	3%

Computer Fundamentals

(Win 95/98)

United States	48%
India	22%
Philippines	3%
Romania	3%
Pakistan	3%

Computer Fundamentals

(Win 2000)

United States	42%
India	17%
Romania	4%
Russian Federation	4%
Pakistan	3%

Adobe Photoshop 7.0

United States	35%
India	16%
Romania	7%
Ukraine 66	6%
Russian Federation	5%

MS Excel 2002 Fundamentals

United States	66%
India	5%
Canada	4%
Romania	3%
United Kingdom (Great Britain)	2%

Health Care Specific

Medical Terminology

United States	72%
India	10%
Canada	4%
United Kingdom (Great Britain)	2%
Pakistan	2%

First Aid Core Knowledge

United States	75%
Canada	5%
United Kingdom (Great Britain)	5%
Australia	2%
New Zealand	2%

Anatomy & Physiology

United States	61%
India	8%
Romania	4%
Canada	4%
United Kingdom (Great Britain)	3%

Medical Office Skills (U.S.)

United States	94%
Canada	2%
India	1%
New Zealand	1%
Romania	1%

Nursing Assistance

United States	86%
Canada	3%
United Kingdom (Great Britain)	2%
Philippines	2%
Australia	1%

C-I: U.S. States ranking based on number of certifications received

1	California	10163	14	Washington	2551	27	Alabama	1125	40	Mississippi	414
2	Texas	8733	15	Maryland	2321	28	Kansas	1100	41	South Dakota	354
3	Florida	6957	16	Minnesota	2147	29	Oklahoma	1099	42	Maine	346
4	New York	5502	17	Indiana	2127	30	Utah	957	43	Idaho	337
5	Virginia	5419	18	Tennessee	2119	31	Louisiana	888	44	Vermont	333
6	Illinois	5360	19	Missouri	2108	32	Arkansas	822	45	Hawaii	316
7	Pennsylvania	4953	20	Massachusetts	2106	33	Iowa	814	46	Rhode Island	304
8	New Jersey	4680	21	Arizona	1932	34	Nevada	736	47	District of Columbia	256
9	Ohio	4218	22	Wisconsin	1723	35	Nebraska	524	48	Alaska	189
10	Georgia	3682	23	Oregon	1437	36	Delaware	515	49	Montana	167
11	Michigan	2991	24	Connecticut	1331	37	New Mexico	504	50	North Dakota	161
12	North Carolina	2762	25	South Carolina	1298	38	West Virginia	500	51	Wyoming	108
13	Colorado	2707	26	Kentucky	1242	39	New Hampshire	496			

D-I: U.S. States Skill Rankings (Top 5) Presented in order of popularity

IT – Database Development and Administration

RDBMS Concepts

California	11%
Texas	8%
New Jersey	8%
Florida	6%
Illinois	6%

SQL (ANSI) Fundamentals

Florida	14%
New Jersey	10%
California	9%
Virginia	7%
Texas	5%

MS SQL Server 2000

Programming

Texas	11%
Florida	11%
California	10%
New Jersey	8%
New York	5%

Oracle PL/SQL

California	12%
Virginia	12%
New Jersey	10%
Ohio	6%
Illinois	6%

SQL (ANSI)

California	11%
Florida	9%
New Jersey	7%
Texas	7%
Virginia	7%

IT – Programming and Development

C++

Illinois	18%
California	13%
New York	11%
New Jersey	10%
Texas	7%

C#

California	13%
Texas	12%
New Jersey	8%
Illinois	7%
New York	7%

Java 2 Platform Enterprise Edition (J2EE)

New Jersey	11%
California	8%
Virginia	8%
Illinois	7%
Texas	7%

Java 2 Fundamentals

New Jersey	13%
California	11%
Texas	7%
Florida	6%
Illinois	6%

C++ Fundamentals

California	17%
Illinois	11%
New Jersey	10%
Texas	9%
New York	6%

IT – Systems and Network Administration

Networking Concepts

California	9%
Texas	9%
Illinois	6%
New York	5%
Florida	5%

Information Technology Security Fundamentals

California	7%
New York	7%
Texas	6%
Virginia	6%
Florida	5%

D-2: U.S. States Skill Rankings (Top 5) *Presented in order of popularity*

Disaster Recovery and Planning

Texas	10%
California	7%
New York	6%
Pennsylvania	5%
Virginia	5%

Internet Security

California	13%
Florida	8%
Virginia	7%
Texas	6%
Illinois	6%

MS Windows Server 2003

Administration

Illinois	12%
Texas	8%
Pennsylvania	7%
California	7%
New York	6%

IT – Technical Support

Technical Help Desk

Ohio	8%
Texas	8%
California	7%
New York	7%
Pennsylvania	6%

Computer Technical Support

Texas	8%
California	7%
Florida	7%
New York	6%
Pennsylvania	5%

MS Windows XP Desktop

Administration

California	8%
Florida	7%
Texas	7%
Pennsylvania	6%
Ohio	6%

Computer Electronics

California	7%
Texas	7%
New York	6%
Virginia	5%
Illinois	5%

Technical Help Desk (Microsoft)

Ohio	9%
Texas	9%
California	8%
Florida	7%
Pennsylvania	6%

IT – Telecommunications

Telecommunications Industry

Knowledge

California	12%
Texas	11%
Georgia	6%
Virginia	6%
New York	5%

Cisco Network Support

California	10%
Florida	22%
New York	7%
Texas	6%
Illinois	6%

WAN Technologies

Texas	10%
Georgia	10%
Ohio	9%
California	7%
Illinois	6%

LAN/WAN Communications

Texas	10%
Georgia	7%
North Carolina	6%
New York	6%
California	6%

IP Routing & Switching

Florida	15%
California	15%
Texas	13%
Illinois	8%
Connecticut	8%

Web Development and Administration

ASP.NET

Texas	15%
New Jersey	11%
California	9%
Illinois	60%
Florida	53%

HTML 4.0

California	9%
Texas	8%
Florida	7%
Virginia	6%
New York	5%

Web Design Concepts

California	9%
Florida	7%
Texas	7%
Virginia	6%
Ohio	4%

PHP 4

California	11%
Texas	10%
New York	7%
Florida	6%
Utah	6%

Java Server Pages (JSP 1.2)

New Jersey	14%
Illinois	8%
Texas	7%
California	7%
New York	7%

D-3: U.S. States Skill Rankings (Top 5) *Presented in order of popularity*

Finance

Accounts Receivable/Billing Fundamentals

California	15%
Florida	9%
Texas	6%
Virginia	5%
Ohio	4%

Accounts Payable Fundamentals

California	12%
Texas	7%
Florida	7%
New York	6%
Ohio	6%

Bookkeeping Fundamentals (U.S.)

California	14%
Florida	9%
Georgia	6%
Indiana	5%
Texas	5%

Payroll Fundamentals (U.S.)

California	9%
Texas	6%
Ohio	6%
Georgia	6%
New York	6%

Financial Accounting (U.S.)

California	14%
Texas	10%
Florida	8%
Pennsylvania	6%
New York	6%

Management

Managing People (U.S.)

California	8%
Texas	8%
Florida	6%
Virginia	6%
New York	5%

Project Management (2000)

California	10%
New Jersey	8%
Texas	7%
Illinois	7%
Virginia	6%

Sexual Harassment Awareness (U.S.)

California	10%
Texas	8%
Illinois	6%
Florida	6%
Pennsylvania	6%

Office Management (U.S.)

Texas	9%
California	8%
New York	6%
Florida	5%
Pennsylvania	5%

Business Ethics Awareness (U.S.)

Texas	8%
California	7%
Pennsylvania	6%
Florida	6%
Ohio	5%

Customer Support

Typing Speed & Accuracy

Florida	11%
California	10%
Texas	7%
Pennsylvania	5%
New York	5%

Data Entry 10-Key

Texas	9%
California	8%
Florida	8%
Pennsylvania	5%
Georgia	5%

Listening Skills

California	10%
Texas	10%
Florida	8%
New York	5%
Virginia	5%

Customer Assistance

Texas	9%
California	7%
Florida	6%
Pennsylvania	6%
Ohio	5%

Telephone Etiquette

California	11%
Texas	9%
Florida	6%
Pennsylvania	5%
Virginia	5%

Sales & Marketing

Marketing Concepts

California	13%
Florida	8%
New York	5%
Virginia	5%
Illinois	5%

Sales Concepts (U.S.)

California	11%
Florida	10%
Texas	7%
Illinois	5%
Pennsylvania	5%

Advertising Industry Knowledge

Texas	11%
California	9%
Tennessee	6%
New York	6%
Minnesota	6%

D-4: U.S. States Skill Rankings (Top 5) *Presented in order of popularity*

Marketing Strategy

Florida	12%
Pennsylvania	11%
California	9%
Texas	5%
North Carolina	5%

Negotiation Strategy

California	14%
Texas	6%
Pennsylvania	6%
Virginia	5%
Illinois	5%

Most Popular Software

Computer Fundamentals (Win XP)

California	8%
Texas	7%
Florida	7%
Pennsylvania	6%
New York	5%

Computer Fundamentals (Win 95/98)

California	9%
Texas	9%
Florida	6%
Illinois	6%
Georgia	5%

Computer Fundamentals (Win 2000)

Texas	8%
California	7%
Pennsylvania	6%
Illinois	5%
Florida	5%

MS Excel 2002 Fundamentals

Texas	10%
Illinois	8%
Wisconsin	7%
California	7%
New York	6%

MS Word 2002 Fundamentals

Illinois	10%
Texas	7%
New York	7%
Florida	5%
California	5%

Health Care Specific

Medical Terminology

Texas	12%
California	7%
Pennsylvania	7%
Florida	6%
New York	5%

Childcare Fundamentals (U.S.)

Texas	8%
California	6%
Virginia	6%
Florida	5%
New Jersey	5%

First Aid Core Knowledge

Texas	10%
California	8%
Florida	6%
Ohio	6%
Pennsylvania	5%

Medical Office Skills (U.S.)

New Jersey	10%
Pennsylvania	10%
Texas	9%
Florida	7%
New York	6%

Nursing Assistance

Pennsylvania	11%
Texas	8%
California	5%
Indiana	5%
Illinois	5%

REFERENCES

1. Robert Half International (2005). *Robert Half Technology Information Technology Hiring Index and Skills Report*. (reported in http://news.zdnet.com/2100-3513_22-5739974.html). Menlo Park, CA: Robert Half Technology.
2. Shikoh, Rafi-uddin (2005, February 13). Pakistan's growing BPO Services Market. *Dinar Standard*. Retrieved from <http://www.dinarstandard.com/innovation/outsourcing20305.htm>.
3. *Three questions: The Ukraine warms up to IT outsourcing*. Retrieved from <http://www.itbusinessedge.com/content/3Q/3qpub8-20050323.aspx>.
4. Lai, E. (2005, June 12) *Lower salaries small piece of offshoring*. East Bay Business Times. Retrieved from <http://msnbc.msn.com/id/8199327/>.
5. Parker, A. (2004, November 9). *Mapping Europe's offshore spending impact: IT View and Business View Trends*. Forrester Research.
6. British Computer Society Working Party on Offshoring (2004, November). *Offshoring: A challenge or opportunity for British IT professionals?* Swindon, UK: British Computer Society.
7. O'Malley, R. (2003). Offshore Outsourcing of Call Centres. *CRM Today*. Retrieved from <http://www.crm2day.com/highlights/EpFZAZEkkklwVWXDial.php>.
8. Economist Intelligence Unit (2005). CEO Briefing: Corporate Intelligence for 2005. Retrieved from http://www.eiu.com/site_info.asp?info_name=corporate_landing_eiu_CeoBriefing2005.
9. Tiobe Software (2005). *TCP (TIOBE Programming Community) Index 2004*. Retrieved from <http://www.developer.com/lang/other/article.php/3448451>.
10. International Association of Outsourcing Professionals (2005). *Outsourcing Insights*. LaGrangeville, NY: IACP Report.
11. McDougall, P. (2005, May 9). Onshore Outsourcing: Made in America. *Information Week*. Retrieved from <http://www.informationweek.com/story/show-Article.jhtml?articleID=162800086>.
12. Robert Half International, *Robert Half Technology Information Technology Hiring Index and Skills Report*.
13. Koch, J. (2005, February). *Thinking Offshoring Through*. Executive Action. New York: The Conference Board.
14. Parker, A., *Mapping Europe's offshore spending impact: IT View and Business View Trends*.
15. CIA World Factbook (2005) Retrieved from <http://www.cia.gov/cia/publications/factbook/rankorder/2119rank.html>.
16. Booz Allen Hamilton (2004). *G&A Survey*. Washington, DC: Booz Allen Hamilton.

Dr. Charles Handler

Charles Handler, Ph.D., is the president and founder of Rocket-Hire (<http://www.rocket-hire.com>), a consultancy dedicated to helping organizations use technology and best practices to build effective, legally sound employee selection systems. Dr. Handler is an internationally known thought leader in the development of online screening and assessment technology. Since starting Rocket-Hire, he has specialized in partnering with customers to develop strategies to help increase the efficiency and effectiveness of the employee selection process. In addition to Internet based hiring practices, Charles has also conducted extensive survey work and created training/development and performance management systems for a variety of companies. He has recently launched the online version of his breakthrough publication: *The Buyer's Guide to Online Screening and Assessment* (<http://buyersguide.rocket-hire.com>)

Dr. Handler's work in building new models for selection using technology has appeared in HR publications worldwide. He is a regular columnist for the *Electronic Recruiting Exchange*, *Workforce Management Magazine*, and *SHRM's Employment Management Today Magazine*. Dr. Handler has also played an active role in education, serving as a member of Tulane University's Business Studies faculty, where he currently teaches Recruitment and Selection, and other HR related topics. He is frequently asked to speak about best practices for employee selection at events such as the Society for Industrial/Organizational Psychology's annual conference, the Electronic Recruiting Exchange Annual Expo, and a many other user conferences and workshops.

Dr. Handler is a member of the American Psychology Association (APA), The Society for Human Resource Management (SHRM), and The Society for Industrial/Organizational Psychology (SIOP). He holds a Ph.D. in Industrial/Organizational Psychology from Louisiana State University and has been working as an employee selection specialist for over 10 years.

Mark C. Healy

Mark C. Healy is a consultant specializing in organizational assessment, hiring, and leadership. He helps business leaders develop human capital strategies and designs hiring, leadership development, and training programs. Mark is a broadly published writer and presents research in a variety of venues, including the Society for Industrial/Organizational Psychology – of which he is a member - and the Decision Sciences Institute. He is the Communication Director for the Bay Area Applied Psychologists organization online. Mr. Healy teaches General and Business Psychology at De Anza College in Cupertino, California. Mark received an M.A. in Industrial/Organizational Psychology from The University of Akron.

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